

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 10 July 2001 (10.07.01)	
International application No. PCT/US00/23124	Applicant's or agent's file reference USPL-77 PCT
International filing date (day/month/year) 23 August 2000 (23.08.00)	Priority date (day/month/year) 24 August 1999 (24.08.99)
Applicant AUERBACH, Roy et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
16 March 2001 (16.03.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Odile ALIU Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To: MAURICE M. KLEE
ATTORNEY AT LAW
1951 BURR STREET
FAIRFIELD, CT 06430

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference USPL-77 PCT	Date of Mailing <i>(day/month/year)</i> <div style="font-size: 1.2em; font-weight: bold; margin-left: 100px;">24 OCT 2000</div>
International application No. PCT/US00/23124	International filing date <i>(day/month/year)</i> 23 AUGUST 2000
Applicant U.S. PRECISION LENS INCORPORATED	

1. ☒ The applicant is hereby notified that the international search report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:
 The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the international search report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland
 Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in rules 90 *bis* 1 and 90 *bis* 3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer <div style="text-align: center;"> CHRISTOPHER MAHONEY </div> Telephone No. (703) 305-3475
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference USPL-77 PCT	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/US00/23124	International filing date (<i>day/month/year</i>) 23 AUGUST 2000	(Earliest) Priority Date (<i>day/month/year</i>) 24 AUGUST 1999
Applicant U.S. PRECISION LENS INCORPORATED		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (See Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 1

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☐ None of the figures.

Box III TEXT OF THE ABSTRACT (Continuation of item 5 of the first sheet)

The technical features mentioned in the abstract do not include a reference sign between parentheses (PCT Rule 8.1(d)).

NEW ABSTRACT

A rear projection screen for use with a projection lens which has an exit pupil (23) is provided. The screen has a light entering side and a light exiting side and comprises in order from said light entering side to said light exiting side: (a) a Fresnel structure (11); (b) a lenslet array (13); and (c) an opaque layer (15) comprising a plurality of pinholes, said pinholes being a location which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/23124

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G03B 21/56

US CL : 359/443, 460

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 359/443, 450, 457, 458, 460

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST search terms: anamorph\$, pin\$, pinhole

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X —	US 4,666,248 A (VAN DE VEN) 19 MAY 1987, (19/05/87) abstract and figures 2, 3a, and 3b.	1, 6-7 and 11-14. ----- 2-5 and 8-10.
Y		
Y	US 4,184,762 A (GUZMAN) 22 January 1980, (22/01/80) figures 3, and 6-9	2-5
X —	US 3,580,661 A (COOPER, JR.) 25 May 1971, (25/05/71) figure 4, col. 4, lines 62-67.	1 and 6-14 ----- 2-5
Y		
Y	US 5,111,337 A (MARTINEZ) 05 May 1992, (05/05/92) figure 1 and col. 3, lines 21-28.	8-10

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

30 SEPTEMBER 2000

Date of mailing of the international search report

24 OCT 2000

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

CHRISTOPHER MAHONEY

Telephone No. (703) 305-3475

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/23124

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3,830,556 A (BRATKOWSKI) 20 August 1974, (20/08/74) figures 6, 8, 13, 19, and 22-24.	1-14
A	US 4,526,439 A (OKOSHI et al) 02 July 1985, (02/07/85) figure 2.	1-14
A	US 5,210,641 A (LEWIS) 11 May 1993, (11/05/93) figures 3-8.	1-14

REPLACED BY
ART. 34 AMEND

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 08 NOV 2001

Applicant's or agent's file reference USPL-77 PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US00/23124	International filing date (day/month/year) 23 AUGUST 2000	Priority date (day/month/year) 24 AUGUST 1999
International Patent Classification (IPC) or national classification and IPC IPC(7): G03B 21/56, 21/60 and US Cl.: 359/457, 460		
Applicant U.S. PRECISION LENS INCORPORATED		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets.
☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 16 MARCH 2001	Date of completion of this report 21 OCTOBER 2001
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer ✓ CHRISTOPHER MAHONEY <i>Christopher Mahoney</i> Telephone No. (703) 305-3475

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/23124

I. Basis of the report**1. With regard to the elements of the international application:***☐ the international application as originally filed☒ the description:pages 1-6, as originally filedpages NONE, filed with the demandpages NONE, filed with the letter of _____☒ the claims:pages 8, as originally filedpages NONE, as amended (together with any statement) under Article 19pages 7, filed with the demandpages NONE, filed with the letter of _____☒ the drawings:pages 1-4, as originally filedpages NONE, filed with the demandpages NONE, filed with the letter of _____☒ the sequence listing part of the description:pages NONE, as originally filedpages NONE, filed with the demandpages NONE, filed with the letter of _____**2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.**

These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☐ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:**☐ contained in the international application in printed form.☐ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.**4. ☒ The amendments have resulted in the cancellation of:**☒ the description, pages NONE☒ the claims, Nos. NONE☒ the drawings, sheets/fig NONE**5. ☐ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).****

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

**Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. statement**

Novelty (N)	Claims <u>2-5</u>	YES
	Claims <u>1, 6-14</u>	NO
Inventive Step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-14</u>	NO
Industrial Applicability (IA)	Claims <u>1-14</u>	YES
	Claims <u>NONE</u>	NO

2. citations and explanations (Rule 70.7)

Claims 1, 6, and 8-14 lack novelty under PCT Article 33(2) as being anticipated by van de Ven. Van de Ven teaches a rear projection screen for a rear projection display comprising a Fresnel lens 20, a lenslet array 17, which may be comprised of anamorphic lenses, apertures 15, and a protective coating layer 11. As discussed in column 1, lines 31-35, the screen is used with a conventional slide or film projector which will have a exit pupil from which images will be projected. The projected images then enter the Fresnel lens 20 on the light entering side 12 of the screen. The Fresnel lens changes the light beam projected by the exit pupil from a divergent beam to a collimated beam. (column 2, lines 40-43). The collimated beam then enters the lenses 17 to be converged at the holes 15. (column 4, lines 46-49). Thus the holes are at locations which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array. As described at column 2, line 67 to column 2, line 2 this is done for the purpose of ensuring "that a maximum amount of light from the primary image-source reaches the viewing space and which minimises reflections of ambient light to the viewing space."

Claim 7 lack an inventive step under PCT Article 33(3) as being obvious over van de Ven. van de Ven teaches the salient features of the claimed invention except for the specific half field of view. It would have been obvious to one of ordinary skill in the art to choose the appropriate field angle based on both optimization and the required viewing angles.

Claims 2-5 and 11-12 lack an inventive step under PCT Article 33(3) as being obvious over van de Ven in view of Guzman. van de Ven teaches the salient features of the claimed invention except for a square/rectangular aperture, the CRT and pixel structure. and the specific viewing angles. Guzman teaches that round apertures and square/rectangular apertures were art known equivalent. Because they were art known equivalents, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a (Continued on Supplemental Sheet.)

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):

square/rectangular aperture instead of a circular aperture.

van de Ven and Guzman teach the salient features of the claimed invention except for the specific half field of view. It would have been obvious to one of ordinary skill in the art to choose the appropriate field angle based on both optimization and the required viewing angles.

Claims 1, and 6-14 lack novelty under PCT Article 33(2) as being anticipated by Cooper, Jr.. Cooper, Jr. teaches a rear projection screen for a rear projection display comprising a Fresnel lens 48, a lenslet array 58, which may be comprised of anamorphic lenses, apertures 62, and a protective coating layer 34. As can be seen in figure 2 the typical projector 12' used with the screen must have an exit pupil to form the divergent beam 14 of images.

Claims 2-5 lack an inventive step under PCT Article 33(3) as being obvious over Cooper, Jr. in view of Guzman. Cooper, Jr. teaches the salient features of the claimed invention except for a square/rectangular aperture, the CRT and pixel structure, and the specific viewing angles. Guzman teaches that round apertures and square/rectangular apertures were art known equivalent. Because they were art known equivalents, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a square/rectangular aperture instead of a circular aperture.

----- NEW CITATIONS -----

NONE

What is claimed is:

1. A rear projection screen for use with a projection lens which has an exit pupil, said screen having a light entering side and a light exiting side and comprising in order from said light entering side to said light exiting side:

- (a) a Fresnel structure;
- (b) a lenslet array; and
- (c) an opaque layer comprising a plurality of holes, said holes being at locations which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array.

2. The screen of Claim 1 wherein the lenslet array comprises elements which have a square aperture.

3. The screen of Claim 2 wherein, in viewer space, the screen has a half field of view α given by:

$$\alpha = \tan^{-1}(0.5 \cdot CA/f)$$

where CA and f are, respectively, the clear aperture and the focal length of the elements.

4. The screen of Claim 1 wherein the lenslet array comprises elements which have a rectangular aperture.

5. The screen of Claim 4 wherein, in viewer space, the screen has a vertical half field of view α_v given by:

$$\alpha_v = \tan^{-1}(0.5 \cdot CA_v/f)$$

and a horizontal half field of view α_H given by:

$$\alpha_H = \tan^{-1}(0.5 \cdot CA_H/f)$$

where CA_v , CA_H , and f are, respectively, the vertical clear aperture, the horizontal clear aperture, and the focal length of the elements.

6. The screen of Claim 1 wherein the lenslet array comprises anamorphic elements.

7. The screen of Claim 6 wherein, in viewer space, the screen has a vertical half field of view α_v given by:

$$\alpha_v = \tan^{-1}(0.5 \cdot CA/f_v)$$

What is claimed is:

1. A rear projection screen for use with a projection lens which has an exit pupil, said screen having a light entering side and a light exiting side and comprising in order from said light entering side to said light exiting side:

- (a) a Fresnel structure;
- (b) a lenslet array; and
- (c) an opaque layer comprising a plurality of pinholes, said pinholes being at locations which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array.

2. The screen of Claim 1 wherein the lenslet array comprises elements which have a square aperture.

3. The screen of Claim 2 wherein, in viewer space, the screen has a half field of view α given by:

$$\alpha = \tan^{-1}(0.5 \cdot CA/f)$$

where CA and f are, respectively, the clear aperture and the focal length of the elements.

4. The screen of Claim 1 wherein the lenslet array comprises elements which have a rectangular aperture.

5. The screen of Claim 4 wherein, in viewer space, the screen has a vertical half field of view α_v given by:

$$\alpha_v = \tan^{-1}(0.5 \cdot CA_v/f)$$

and a horizontal half field of view α_H given by:

$$\alpha_H = \tan^{-1}(0.5 \cdot CA_H/f)$$

where CA_v , CA_H , and f are, respectively, the vertical clear aperture, the horizontal clear aperture, and the focal length of the elements.

6. The screen of Claim 1 wherein the lenslet array comprises anamorphic elements.

7. The screen of Claim 6 wherein, in viewer space, the screen has a vertical half field of view α_v given by:

$$\alpha_v = \tan^{-1}(0.5 \cdot CA/f_v)$$